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The Geography of Ethnic Residential Segregation: A Comparative Study of Five Countries

Ron Johnston*, Michael Poulsen[†] and James Forrest[†]

**School of Geographical Sciences, University of Bristol*

[†]Department of Human Geography, Macquarie University

Few studies have undertaken rigorous comparative analyses of levels of ethnic residential segregation across two or more countries. Using data for the latest available censuses (2000-2001) and a bespoke methodology for such comparative work, this article analyses levels of segregation across the urban systems of five major immigrant-receiving, English-speaking countries: Australia, Canada, New Zealand, the United Kingdom and the United States of America. After describing the levels of segregation in each, the paper tests a model based on generic factors which should influence segregation levels in all five countries and then evaluates – for the urban population as a whole, for the “charter group” in each society, and for various ethnic minority groups – whether there are also significant country-specific variations in segregation levels. The findings show common factors influencing segregation levels in all five countries – notably the size of the group being considered as a percentage of the urban total, but also urban size and urban ethnic diversity – plus country-specific variations that cannot be attributed to these generic factors. In general there is less segregation in Australia and New Zealand than in the other three countries.

Key words: ethnicity, urban, residential segregation, comparative

Ethnic residential segregation in cities has attracted much attention from geographers and sociologists. Researchers have explored, mapped, described and analyzed the degree to which various ethnic-racial groups are spatially separated in their residential milieux both from each other and from the dominant group within their society. Only recently, however, has this body of literature become more rigorously analytical, through attempts to explain *why* patterns vary, not only within individual countries but also internationally. (On the former, see Forrest, Poulsen and Johnston 2003; Hume and Hardwick 2005; Skop and Li 2005: for attempts to model the situation in different countries, see Peach 1999, 2006a; Johnston, Forrest and Poulsen 2004a, 2005; Engelen 2006.)

Peach (2006a; see also Boal 1999) outlines two main theories which offer accounts of the spatial patterning of “ethnic” minority immigrant groups alongside that of their “host society”: assimilation (or the “melting pot”), and multiculturalism (social pluralism). Multiculturalism involves economic fusion but can be associated with residential segregation – a mosaic of plural cultures – if ethnic minority group members wish to retain their cultural identity and social separateness. Assimilation involves gradual removal of not only economic but also cultural and social differences and leads to the reduction and eventual ending of spatial separateness; if it occurs at differing rates for different groups this can generate “segmented assimilation” (Portes

and Zhou 1993). Thus whereas Peach (1999; 2006a) sees assimilation and multiculturalism as polar opposites, segmented assimilation brings the multicultural model of ethnic minority group acceptance much closer to the melting pot model, with inter-country variations in levels of residential segregation subject principally to national differences in their respective immigration histories and policy settings – in Australia, for example, multiculturalism is seen by some researchers as “assimilation in slow motion” (Jamrozik et al. 1995, p. 110). Even so, Peach (2006a, 22) found little distinction in levels of segregation between Canada’s multicultural mosaic and the U.S. melting-pot.

A major feature of the residential segregation literature, across all social science disciplines, however, is how little of it has been rigorously comparative, within individual countries let alone across countries. Many studies show varying levels of segregation across a country’s urban places, for example, but few ask why these exist.¹ Across countries, collections of papers provide comparative data about immigrant labor market experiences (Hiebert and Ley 2006) and levels of residential segregation (for example, Glebe and O’Loughlin 1987; Musterd and Ostendorf 1998). Although the individual country analyses may be undertaken and reported in a standard format, however, the material is not synthesized in any formal way. (One major exception to this statement is Peach, 2006a: see also Fong 1994, 1996, and Walks and Bourne’s, 2006, classification of Canadian cities according to their segregation levels.)

This lack of rigorous comparative analyses, especially across countries, reflects a number of factors. Data collection systems vary among national census bureaus, for example, both in their definitions of ethnicity and in the spatial architectures for reporting data – particularly at fine scales. Furthermore, little attempt has been made to develop a standard methodology for comparative studies. However, data on the ethnic composition of urban populations are now available for a number of English-speaking countries, at small area scales (with populations of, at most, only a few hundred persons). More importantly, analytical procedures have been developed and tested to allow rigorous comparative study – replacing the standard indices of dissimilarity, segregation and isolation which are of limited value for comparative analysis across both time and space (Poulsen, Johnston and Forrest, 2001, 2002: see also Poulsen and Johnston, 2000). Thus an important lacuna in segregation studies can now be filled, inquiring into the nature, extent and reasons for differences (if any) within and between countries in the residential experiences of their ethnic minority populations.

This article addresses that lacuna by reporting on a comparative study of Australia, Canada, New Zealand, the United Kingdom, and the United States of America. The United States exemplifies assimilation, while Canada pursues an avowedly multicultural policy stance but with two “charter” and other “visible minority” groups enshrined in national legislation (Peach 2006a). The United Kingdom, Australia and New Zealand, while adopting multiculturalism as national policies, are arguably closer to the segmented assimilation model (Forrest et al, 2006; Poulsen et al., 2001).² The differences among the countries are largely rhetorical to the extent that government actions rarely directly influence residential segregation: none has explicit housing policies promoting a settlement pattern to meet its goals regarding inter-

ethnic relations and residential locational decisions are almost entirely left to individual choices and market forces.

The methodology deployed here uses small-area data from five different censuses, across a large number of cities and metropolitan areas.³ This information allows evaluations of levels of residential segregation in each country's cities, most of which have experienced substantial recent in-migration of minority groups as well as, in some cases, of first nation peoples who have been marginalized within the country's economy, society and polity. Although each country has a distinctive cultural matrix within which those ethnic minority groups' experiences are set, they also have much in common, four of them as 'white' settler nations derived largely from peoples of English-speaking backgrounds.⁴

Two key questions are posed here. First, *are there variations across the five countries in levels of ethnic residential segregation?* This is addressed by analyzing segregation levels – i.e. the degree to which members of different groups live apart from each other. The second question flows from the first. Although they provide relatively little formal analysis, many studies (such as Duncan and Duncan 1957, Taeuber and Taeuber 1965, and Massey and Denton 1993) have shown substantial inter-urban variations in segregation levels. Recent studies of individual countries (Johnston et al 2004a, 2005) have demonstrated that these variations are strongly related to a small number of system-wide variables – notably urban size, urban ethnic diversity, and the relative size of individual minority groups. Any inter-national differences in segregation levels identified in answers to the first question posed above may therefore be a function of differences between countries on those key variables. To explore whether this is so, our second question is: *are observed variations across countries in levels of ethnic residential segregation a reflection of generic influences, which once held constant remove those inter-national differences, or do they reflect country-specific factors suggestive of an “everywhere different” scenario?* To address this, we formulate and test regression models incorporating both generic and country-specific variables.

The Study of Ethnic Residential Segregation

Segregation of ethnic groups in urban residential space is a consequence of three processes: discrimination; disadvantage; and individual choice. (An excellent, brief, introduction to these processes is Blalock, 1982, Chapter 6.) *Discrimination* involves members of defined groups being denied access to (or made to feel unwelcome in) particular areas, either by law – as for Blacks in parts of the United States until relatively recently (Massey and Denton, 1993, discuss blacks being “cast out” from parts of northern cities in the 1920s and virtually “forced” to live in ghettos: see also Goldberg 1998) and, for more than fifty years, in the classic case of South African apartheid – or through the operation of formal mechanisms; these include restrictive covenants with owners agreeing not to sell or lease/rent properties to members of defined groups (see Johnston 1983), mortgage lenders' “redlining” policies, and other forms of social marginalization (Dunn et al 2003). Such policies and processes reflect deep-seated feelings within societies' dominant (usually majority) groups which not only clearly identify “us” as separate from “them” (separate conceptions of in-groups and out-groups) but also incorporate a desire to distance “us” (usually, though not always, the hegemonic majority) from “them”, so as to minimize inter-group contact

and thus avoid potential “contamination”. Members of many ethnic groups have experienced such residential distancing by discrimination at certain times and in certain places (as well as in workplaces and schools).⁵

Whereas discrimination involves institutionalized residential sorting mechanisms, segregation by *disadvantage* results from processes that apply to all members of society, but unequally. Three spatially-structured processes are relevant. Labor market operations determine people’s occupations and their rewards, which in turn reflect their human resource potential and its realization. For some, innate characteristics strongly influence their ability to compete in such markets but for most the development of those characteristics through education and training strongly influences their position in the occupational status structure and its outcomes – income, wealth, status and power (e.g. Forrest and Johnston, 1999). Success in the labor market then strongly influences their ability to compete in the housing market, which in the countries studied here is dominated by owner-occupation and a clear geographical structuring of homes by tenure, value, quality and desirability. These two processes are spatially interlinked. In larger cities, labor markets are spatially structured according to the distribution of employment opportunities, for example, making some relatively inaccessible to those restricted to particular spatial sections of the housing market.

School systems are also spatially structured: some have rigidly enforced catchment areas and serve their local population almost exclusively; many others predominantly draw students from their immediate hinterland. Where schools vary in their quality – in resource infrastructure, the quality of teaching staff, peer pressures and expectations, for example – this produces a geography of educational opportunity. Many of the poorest quality schools serve the more deprived neighborhoods containing households that are relatively unsuccessful in the labor market and unable to escape the confines of the cheaper, poorer quality housing. A cycle of disadvantage is established, with the spatial structuring making it difficult for children of disadvantaged households to capitalize on their human resource potential and promote their life chances through education.

Changes in these processes need not proceed at the same pace, however. In the United States, for example, there is evidence of ethnic minority groups being less segregated in the labor market than in the housing market, so that – for those in employment at least – the restricted social contact experienced in residential milieux is partially ameliorated by (potential) contact opportunities at their workplace (Ellis et al 2004). This is much less true with many urban educational systems there, however: widespread school desegregation has not been achieved following the key *Brown v Board of Education* Supreme Court judgment and many subsequent decisions, because of white residential and schooling choices (see Armor and Rossell 2002). In the U.K., schools are more ethnically segregated than the neighborhoods on which they draw (Johnston, Burgess et al 2006).

Disadvantage can generate not only social but also spatial exclusion, therefore: those unable to compete in neo-liberal capitalist society are unable to gain access to parts of the city where they may be better able to contest such exclusion, thereby intensifying their disadvantages (Massey and Denton 1993). This is a particular problem for some ethnic minority groups, whose difficulties in the labor and housing markets, and in the

educational system, are exacerbated by aspects of their backgrounds, such as language and cultural values. A common consequence of this is that members of those groups cluster together in sections of the housing market to a much greater extent than might be expected on the basis of their human resource condition and labor market performance. Such *voluntary “self-segregation”* may be linked to migration processes: movers to a city are encouraged to do so by friends and/or kin already there, who find them homes and employment nearby. Chain migration promotes such residential sorting, often enhanced by the creation of strong communities in areas which sustain the migrants in the context of a somewhat alien “host” culture: their “urban villages” provide cultural and sometimes physical security, through institutional and personal links, as well as employment opportunities in local, ethnic, businesses (Waldinger et al, 1990). Many individuals thus choose to sustain their cultural traditions and values by living in close proximity to their co-ethnics and distancing themselves from others.⁶ (Note, however, Zelinsky and Lee’s, 1998, argument that greater mobility means that such cultural communities can now be sustained within urban areas without residential proximity.)

In their model of the urban experience for ethnic migrants to U.S. cities, the Chicago School saw congregation into (usually inner-city) enclaves as temporary. As immigrants and, especially, their children became assimilated into the wider “host” economy they would feel more comfortable in its culture and less likely to wish to distance themselves from it in their housing arrangements.⁷ American cities were vast melting pots; a continuous process of societal hybridization was operating as “new” groups became part of the wider society, bringing aspects of their cultural backgrounds to it as they at least partially abandoned their separate identities. Economic, social, cultural and political assimilation was thus associated with spatial assimilation, by the ending of their over-concentration into ethnic enclaves – a process that was charted through the twentieth century for many ethnic immigrant groups whose origins were European, but not for the Blacks who migrated to the country’s cities from their poverty-stricken homes in the rural south. Recent decades have seen new streams of migrants from Asia and Latin America, who appear to be passing through a similar sequence.

This assimilation model was applied in other countries which also experienced major migrant streams from European origins– such as Australia (Forrest et al 2006), Canada and New Zealand (Hiebert et al 2003). But there, as to some extent in the U.S.A. and the U.K., the latter decades of the twentieth century were associated with an alternative, multi-cultural, model of the immigration process. According to this formulation, economic and political assimilation need not be accompanied by cultural and social integration. The migrant groups should be supported (if not encouraged) if they wish to sustain their separate identity and cultural practices – including preferring to stay in relative residential separation – as long as, and as clearly set out in Australia’s multi-cultural policy, they are prepared to meet their “obligations” to the wider society. National policies have promoted multi-culturalism, advancing a rhetorical model (backed by some institutional actors, such as the Commission for Racial Equality in the U.K.) of economic and political equality of opportunity, in which all ethnic and other culturally-distinct groups who wish to maintain their separate identity are treated as equals: difference is to be respected and diversity celebrated.

Residential sorting is not an integral element of such policies, since individuals determine their living arrangements – there are no explicit housing policies in the U.S.A promoting assimilation, for example, nor explicit policies in the other four countries promoting particular settlement patterns. Nevertheless, the pursuit of multi-cultural goals has not always been straightforward because maintaining residential distancing can sustain ideal typifications of “us” and “them” which may – through lack of contact (not least at schools in formative years) – lead to inter-group mutual lack of appreciation (even ignorance).⁸ This may stimulate stereotyping and inter-group intolerance (as suggested in official reports on the “race riots” in several northern English cities in 2001 – Amin 2003 – and with respect to racism in Australia – Forrest and Dunn 2006).

Whether a country adopts a melting-pot (assimilationist) or multi-cultural (culturally-pluralist) approach, there is likely to be residential segregation in the short-term. Peach (2006a) has suggested from his comparison of the U.S.A. and Canada as exemplars of the two models that, with the exception of the experience of Blacks in U.S. cities, different national policies (the one promoting assimilation, the other multi-culturalism) are not reflected in different residential patterns. Does this conclusion have wider validity? Varying national policies are not the only factors likely to impact upon levels of segregation, however: different lengths of time that groups have been resident in a country/city and differences across as well as within countries in inter-group social distancing will also be influential. These cannot readily be interpreted in a general model, but underpin the interpretation of that formulated below to address the two questions posed in the introduction to this article.

The Five Countries

The five countries studied here have a number of common characteristics, not least a cultural background which originated in the United Kingdom. Four originated as settler colonies in which, for a long time, people from the United Kingdom and Ireland dominated immigration streams.

For the United States and Canada, the original migrant streams from the British Isles were soon supplemented, and then overtaken, by people from northern, eastern and southern European origins most of whom, over a period of decades, were assimilated into the continually-hybridizing host society. Canada differed because of its substantial number of people of French origin, mainly concentrated in the province of Québec, who retained much of their cultural identity – notably language and religion; the United States differed in its large number of Black residents, who remain highly segregated. Since the 1960s, each country has attracted substantial immigrant flows from parts of Asia, especially of Chinese and (in the U.S.A. more than Canada) Korean and Vietnamese origin (Ruble 2005). The U.S.A. has also attracted large numbers of Hispanic (or Latino) migrants, mainly from Mexico but also several Caribbean islands (notably Cuba and Puerto Rico) and central American countries. (For a comparative analysis of the impacts of immigration in these two countries, see Kivisto 2002.)

Immigration flows to Australia and New Zealand were largely restricted to British Isles’ origins until after the Second World War, when Australia extended its hinterland to central, eastern and southern Europe, in order to meet labor demands;

New Zealand attracted only small numbers from those origins (Thomson and Trlin, 1970). Australia abandoned its “White Australia” policy in the early 1970s and began to accept large numbers, dominated by Asians, under several programs comprising a minority of refugees and their families (which also brought substantial numbers of immigrants from the Middle East) and a majority component focusing on those with particularly demanded skills (Burnley 2001; Jupp 2003). New Zealand abandoned its “White New Zealand” policy in 1986, admitting immigrants from Asia, either as skilled workers (the majority) or as refugees (Trlin et al 2005; Pearson and Ongley 1996). In addition, New Zealand accepted substantial migrant populations from a number of Pacific Island countries, some of whom had colonial rights-of-entry to the country. Even more importantly and, as with African-Americans in the U.S., large numbers of indigenous Maori – who had been concentrated in remote rural areas since the late nineteenth century – moved to the towns and cities from the mid-20th century (Johnston, Poulsen and Forrest 2003). On the other hand, Australia’s much smaller Aboriginal population (less than two per cent of the national total), which was for long marginalized – neither counted in the national census nor accorded citizenship until the late 1960s, for example – and spatially confined in remote “reserves”, has had little impact on the ecological structure of the country’s cities.⁹

For much of the nineteenth and twentieth centuries the United Kingdom was a net exporter of migrants and remained culturally relatively homogeneous compared to the four settler countries just discussed. The 1950s saw a major shift, however, with Black people in West African and Caribbean colonies encouraged to move to Britain to meet labor shortages, especially in low-skilled, low-wage occupations. This stream was followed, a decade or so later, by immigrants from the Indian sub-continent (India, Pakistan and Bangladesh).¹⁰ Most of these, too, were attracted to low-wage occupations (in the textile industries, for example), but there was also a concentrated stream of Indian migrants from Uganda following their expulsion by Idi Amin: many were professionals or traders. From the 1970s on, attempts were made to limit immigration, other than from countries of the European Union who have the right of entry to work and live the United Kingdom; people of non-white ethnicity currently comprise no more than 12 per cent of the total population, a smaller proportion than for any of the other four countries (Geddes 2003).

By the end of the twentieth century, each country had a multi-ethnic population, albeit one dominated (both numerically and socio-culturally as well as economically and politically) by people of British stock – though more hybridized in Australia, the U.S.A. and, to a lesser extent Canada through the assimilation of substantial numbers of people from continental European backgrounds than was New Zealand. As a response, in four of them formal attempts have been made to establish a multi-cultural society based on principles of justice and equality and valuing diversity. In the U.S.A., however, assimilation remains the dominant value system with regard to immigrants, promoting the middle-class American dream to all (Clark 2003).

Given these variations across countries, there may be differences in levels of residential segregation of comparable ethnic groups, reflecting international variations in immigration streams and inter-relationships, both among ethnic groups and between each group and the “host” population. Before introducing a model designed to test for such differences, however, the next section introduces the measurement

system deployed to describe segregation levels, which is followed by an initial descriptive exploration of the levels uncovered.

Measuring Segregation

Sociologists, geographers, statisticians and others have for long debated how to measure segregation. Claiming to resolve the methodological confusion, Massey and Denton (1988) took twenty separate measures deployed in the U.S. literature and fitted them into a conceptual schema comprising five separate dimensions: unevenness; exposure; concentration, centralization, and clustering. These refer to different aspects of the geography of where group members live, and Massey and Denton claimed that the five conceptual dimensions were also empirically distinguishable in studies of segregation in U.S. cities (see also Massey et al 1996). Johnston et al (2007) have suggested that there are just two, however – separateness (combining unevenness, isolation and clustering) and location (combining centralization and concentration). Our analyses here concentrate on the former.

Whatever the number of separate dimensions, all of the indices involved in Massey and Denton's study suffer one major disadvantage – they are averages and tell only a certain amount about the segregation situation. (See, for example, the critique of the index of dissimilarity in Goering 2006.) This is also the case with recent proposals by geographers (e.g. Wong 1998, 2005; Reardon and O'Sullivan 2004) who claim that the commonly-deployed indices of unevenness and isolation are in one sense aspatial since they do not take clustering into account: their suggested composite indices are more sophisticated (although less readily interpreted other than in a relativistic sense) but similarly suffer from being statements of the average situation only.

Take, for example, the most widely used segregation index – dissimilarity. This measure of the unevenness of two distributions varies between 0 and 100: 0 indicates that the two distributions are completely similar (i.e. the same percentage of the total population of each of the groups being compared can be found in each of the unit areas being deployed – such as census tracts); 100 indicates complete dissimilarity – there are no members of group *x* in tracts where there are members of group *y*, and vice versa. Values between 0 and 100 indicate the degree of unevenness, and are interpreted as the percentage of the members of one group that would have to be redistributed across the census tracts to produce an index of 0. But the index says nothing about the residential context in which members of group *x* live: what proportion of them live in areas where their group is in the majority; what proportion live in areas where members of group *y* are in the majority; what proportion live in areas with relatively equal proportions of groups *x* and *y*; and so on? Furthermore, and of particular importance given the nature of model (1) introduced below, this index – and others widely used such as the index of isolation – are not independent of the relative size of an ethnic group within an urban population (as shown by Cutler and Glaeser, 1997, Cutler et al, 1999, and Noden, 2000: see also Johnston et al, 2004a).

These commonly-used indices present a number of problems for comparative research, therefore, so an alternative approach has been developed, using absolute values and therefore allowing comparability across time and space (Poulsen et al 2001). This uses much more of the census information regarding the residential distributions of ethnic and other groups,¹¹ and identifies the proportion of an ethnic

group living in different types of residential milieu. It is based on the situation in a city comprising one dominant group (X : often referred to as the “host society”, though see below) – which in most cases is in a numerical majority – and two or more ethnic minority groups (y and z in this presentation): group X is assumed to be the most successful economically, and to dominate politically. Segregation is defined as a combination of three processes generating (as suggested by Philpott 1978, and Peach 1996):

1. The degree to which members of the dominant group, X , live apart from (share residential space with) members of groups y and z ;
2. The degree to which members of the minority groups y and z live apart from (share residential space with) members of the dominant group X ; and
3. The degree to which members of the minority groups y and z live apart from (share residential space with) each other.

Note that the first two of these are only symmetrical if X and $(y + z)$ form the same proportions of the population total.

On the basis of these three components of the residential segregation process, the unit areas in a city – e.g. its census tracts – are divided into six categories, based on ethnic minority and host society shares of the local population, as shown in Figure 1. These categories – or type areas – are:

- I. Areas where members of the majority group – X – predominate, forming more than 80 per cent of the total population;
- II. Areas where members of the majority group – X – dominate, forming 50-80 per cent of the total population, but members of ethnic groups y and z form a substantial minority;
- III. Areas where members of ethnic groups y and z dominate, forming 50-70 per cent of the total population, but members of the majority group – X – form a substantial minority;
- IV. Areas where members of ethnic groups y and z predominate, forming 70 per cent or more of the total, but neither group dominates the other;
- V. Areas where members of ethnic groups y and z predominate, forming 70 per cent or more of the total, and one group is at least twice as large as the other; and
- VI. Areas where members of ethnic groups y and z predominate, forming 70 per cent or more of the total, one group is at least twice as large as the other, and at least 30 per cent of that group’s total population in the city live in those areas.

Type I tracts are areas of extreme segregation, where members of the majority group live in relatively exclusive separation from the ethnic minorities (what Marcuse, 1997, terms “white citadels”). Types IV-VI are similarly highly segregated areas where the ethnic minorities live very largely apart from the majority group: within those three, Type V areas are typical ethnic enclaves where one group predominates, whereas Type VI areas are characteristic of ghetto-like situations. Type II and III areas are relatively mixed in their ethnic composition. (Most of the boundary lines between the types are based on a simple majority-minority division: those between Types I-II on the one hand and Types III-IV on the other are relatively arbitrary, but were based on inspection of a large number of data sets. Exploration suggests that moving them slightly – for example, that between types I and II from 80 to 75 per cent – would change the absolute patterns though not the relative situation.¹²)

This procedure is based on absolute levels of concentration, so the outcome of the classification of areas according to their ethnic composition is not a function of the relative size of any one group. Knowing the percentage of each group – X , y , z (the procedure can be applied to any number) – living in each type of area provides a clearer indication of the residential situations experienced by members of different groups within a city than any single index number can.

Portraying Segregation Comparatively

The percentage of a city's population, and of its component groups, living in these different types of area is the focus of the remainder of this article. We use the latest census data – 2000 for Canada and the U.S.A.; 2001 for Australia, England and Wales,¹³ and New Zealand – to describe levels of segregation in their major urban areas at the smallest spatial scale available: collection districts in Australia (average population, 570), dissemination districts in Canada (600 persons), meshblocks in New Zealand (120), output areas in England and Wales (297 persons) and census blocks in the U.S.A. (800 persons). The places studied are all those above a size threshold for which data are provided and which had at least 10 per cent of their populations in ethnic groups other than the dominant majority: in addition, we only looked at those places where one of these groups comprised at least 5000 individuals. The number of places studied was 14 in Canada, 17 in New Zealand, 46 in England/Wales, 51 in Australia and 223 in the U.S.A..

For each country we use the main ethnic classification employed by the census authorities, with some modifications to produce a manageable data set yet provide insight to the main patterns. For the U.S.A., we use the four main groups – White, Black (or African-American), Hispanic and Asian. Of these, only the Black category is relatively homogeneous: individuals claiming Hispanic and Asian ethnicities have a range of separate cultural and national backgrounds – and may occupy separate residential spaces – as do those put together in the White category. For Canada the data on charter groups and visible minorities were aggregated into four groups – White, Asian, Black, and Hispanic. The U.K. census categorizes people into sixteen separate, self-assessed, ethnic identities, but apart from White the largest groups comprise three with origins in South Asia (Indian, Pakistan and Bangladesh) and three categorized as Black (Caribbean, African, and other). These are reduced to two composite categories – Black and South Asian. At the spatial scale deployed here, the New Zealand census identifies four separate ethnic categories – New Zealand European, Maori, Pacific Island, and Asian. Finally, only the Australian census does not ask people their ethnic identity but rather inquires into their ancestry (i.e. parental birthplaces). In this case, therefore, we have combined data on birthplace and ancestry to create five categories – White, European, Middle Eastern, Pacific and Asian. This separates out two “white” groups, which we term elsewhere (Poulsen et al, 2004) the “Anglo-Celtic” and “non-English-speaking-background” (NESB) groups, between which the social distance is relatively small. The U.S. and Canadian censuses do the same (separately identifying non-Hispanic whites and Latinos in the former case and French from other whites in the latter). The New Zealand census does not have a similar separation, because most of its “white” population is from English-speaking backgrounds.

One problem encountered is terminology. Much writing using the Chicago School's framework refers to a city's dominant group as the "host society" – implying that the ethnic migrant groups are recent arrivals. This is not the case in four of the five countries studied here, where the dominant group – numerically, economically and politically – is not the "first nation(s)": these are the Aborigines and Torres Strait Islanders in Australia, the Inuit and American Indians in Canada, the Maori in New Zealand, and the American Indians (plus the native Polynesians of Hawaii) in the U.S.A..¹⁴ One alternative term, first deployed in Canada but applied more widely to "settler societies" (Porter, 1965), is the "charter group" (or charter ethno-class) which "establishes the state in its "own vision", institutionalizes its dominance, and creates a system which segregates it from other ethno-classes" (Yiftachel, 1999, 365). Other groups are "gradually assimilated" into this charter group, a process which "generally reproduces the dominance of the charter group for generations to come" (p. 366). In Yiftachel's description of such ethnocratic regimes the charter group "appropriates the state apparatus, determines most public policies, and segregates itself from other groups" (p. 368). The hegemonic status that such groups appropriate closely resembles the situation in the five countries studied here. Hence we occasionally use the term charter group, with "majority group" as a synonym.

As in virtually all comparative studies based on separately collected information, the 21 ethnic categories used here are not ideal, but are the best available for wide-ranging comparative studies of residential segregation at a fine spatial scale. The Australian data are potentially more problematic, because they are not based on people's claimed ethnic identity: if part of residential distancing can be associated with "self-segregation" (see above), then self-identity is likely to be a better indicator of the desire for this than either birthplace or ancestry. The Canadian data also involve self-identification: census respondents are asked to indicate whether they are White or belong to one of ten "visible minorities" (Chinese, South Asian, Black, Filipino, Latin American, Southeast Asian, Arab, West Asian, Japanese, Korean, other). The New Zealand data differ somewhat in being based on smaller areas than in the other four countries which could – as the modifiable areal unit problem indicates – result in higher average observed segregation levels (other variables being held constant).

The Urban Ethnic Structures

The ethnic composition of the urban areas studied here is set out in Table 1. On average, all have around four-fifths of their population drawn from the majority group (as shown in the third column), although the range – shown by both the minimum and maximum figures and the standard deviations – is much greater in the U.S.A. (4.9-94.5) than in the other four countries where the charter group forms at least 56.8 per cent of the total (the minimum value, for Australia). New Zealand has the largest proportion of its urban population in an ethnic minority group, with Maori accounting for almost one-fifth of the urban totals on average. In the other four countries, the largest group on average comprises about ten per cent, although the range across cities is generally much greater in the U.S.A.. The maximum percentage for Blacks there is 51, for example, for Hispanics it is 94, and for Asians it is 45; no other country has a maximum percentage above 40 – for New Zealand Maori. Nevertheless, if one adds the mean percentages for the various ethnic minority groups for each country, New Zealand has the most diverse urban population ethnically, at 28.6 per cent; the respective figures for the U.S.A., Canada and Australia are some ten points lower at

23.3, 17.8 and 17.4 respectively, whereas England/Wales cities have the least diverse populations with a sum of only 11.7.

All five countries have cities in which each of the relevant ethnic groups comprises only a very small proportion of the total population: the main exceptions are the indigenous Maori in New Zealand, who form at least 5.6 per cent of the urban population across all 17 places analyzed here, and Europeans in Australia, who form at least 8.1 per cent. (The latter reflects the local classification of NESB Europeans as separate from the charter group.) The maxima are much greater in the U.S.A., however, with Blacks, Hispanics and Asians comprising as much as 50.8, 94.3 and 45.3 per cent of the urban total in at least one case each; Asian groups have high maximum values in both England/Wales and Canada.

Although each of these societies is multi-ethnic, its different minority groups may be concentrated in different places within their urban systems (as with Blacks and Hispanics in the U.S.: Johnston et al 2006a). To measure the degree of ethnic diversity within individual places we use the entropy index. The higher its value the more diverse the city's population.¹⁵ The mean values in Table 1 show that on average four of the countries have similar relatively high levels of ethnic diversity. The exception is England/Wales with an average of 0.40. New Zealand cities have the most ethnically-diverse urban populations (mean of 0.78), but the greatest variation is in the U.S.A..

Are these differences reflected in residential segregation levels both within and across countries? The remainder of this article involves two approaches to answering that question. The first establishes whether there are cross-country differences in levels of segregation for all groups, including charter groups. Previous studies have shown that the situation for Blacks in the U.S.A. differs from that for comparable groups in both the U.K. and New Zealand (Peach 1999; Johnston et al 2002, 2006b); this study extends that to all groups and all five countries. Using analyses of variance, we explore whether there are significant differences across the five countries in the proportions living in the type areas shown in Figure 1. This is done in three sets of analyses. In the first, we look at distributions of the total urban population across the various types, to establish whether there are variations in the extent of segregation as a city-wide phenomenon: the more segregated a city, for example, the greater the proportion of its population living in Type I and Type IV-VI areas; the less segregated, the greater the proportions in Type II-III areas. That overall pattern may not apply equally to all sections of the urban population, however. Thus, secondly, we conduct similar analyses for the charter group, to explore intra- and, especially, inter-country variations in the experience of this hegemonic group. Finally, we look at the situation for the non-charter, ethnic minority groups, both collectively and – where feasible given data constraints (mainly numbers of cases) – for individual groups. These three sets of analyses give clear insights into the levels of segregation, both overall and as they apply to different population components.

Having established the extent of the international differences, the second approach, in the final sections, explores differences within as well as between countries in levels of segregation across urban areas. As already noted, Johnston et al (2004a, 2005) have established substantial differences between cities within two of the countries studied here that are associated with basic parameters representing the cities' ethnic

composition. That work is extended here using a regression model incorporating both the generic influences identified in those individual country studies and country-specific variables. This is tested for the same population data as before – the total population of each urban area; the charter group; and the ethnic minority groups. Overall, the model tests whether segregation levels can be successfully estimated, with individual terms establishing whether those estimations include both the generic (cross-country) and specific (individual country) factors: the analyses are conducted in a stepwise framework to establish the relative importance of the generic and country-specific variables.

Variations in Segregation Levels I: The Total Population

Table 2 gives summary statistics for the distributions of the total urban population in each of the five countries across the six residential area types plus the F-coefficient for a one-way analysis of variance (ANOVA) comparing the five countries.

The ANOVA results show a significant difference at the 0.05 level or better across the five countries in every case, and at the 0.001 level or better in four of the six (the exceptions are for Types I and V). The means for Type VI (the ghetto equivalent) indicate much greater segregation into such areas in the United States than elsewhere: on average almost 11 per cent of its urban population live in areas where a single ethnic minority group not only dominates but in addition over 30 per cent of its members live. The other four countries have virtually nobody living in such exclusive areas. In the United States a maximum of 56 per cent of the population in one urban area lives in such ghettoized spaces, three times the highest values for both England and Wales and Canada. Because of the uniqueness of the U.S. situation with regard to these type VI areas, they are excluded from the remainder of the analyses.

Differences in mean values are much less pronounced for types IV-V, although in each case Australia has significantly lower percentages than the other four countries. New Zealand has by far the highest mean percentage of its urban populations living in the most mixed areas with an ethnic minority majority (type III) – more than twice the figure for any other country. Overall, however, the mean percentages in Types III-VI are small, indicating that the majority of the urban populations of the five countries are not resident in areas where minority ethnic groups form a majority of the local population.

For the areas where members of the charter group are in a majority (Types I-II), the means clearly distinguish between the three northern and two southern hemisphere countries. The latter have much larger percentages living in Type II areas (with a charter group majority but substantial – 20-49 per cent – non-charter group minority): indeed, these contain the entire population in one Australian city. In contrast, fewer people in those two countries live in the charter group citadels (Type I), even though their charter group percentages are to those in the other countries.

Having identified major differences across the five countries in the proportions of their urban populations living in the six area types – greater proportions in the extreme ethnic-minority-dominated areas in the U.S.A. than elsewhere; greater proportions in relatively mixed residential areas in the two southern hemisphere countries – Table 3 extends this analysis by examining inter-country differences in the

percentages living in various combinations of those types. These combined categories have been explored to give a broader picture of the situation than the six types provide, and also because of the small percentages in some types (notably V-VI) in some countries: they provide clear statements of the levels of concentration in the more segregated areas (I; IV-VI) as well as the more mixed (II-III). Again, the ANOVA results indicate statistically very significant differences: all five F coefficients are significant at the 0.001 level or better.

The first three categories (involving Types III-VI areas with non-charter group majorities) look at various combinations of areas with ethnic minority majorities. Combining types V and VI – where members of minority groups form at least 70 per cent of the population and one group predominates – U.S. cities stand out: the maximum percentage there is almost three times that for England/Wales and Canada and almost twenty times that for any Australian city. Similarly, when the three types that have the ethnic minority population comprising at least 70 per cent of the local total are combined (Types IV-VI), U.S. cities stand out as substantially more segregated, again particularly more so than the two southern hemisphere countries, with England/Wales and Canada occupying intermediate positions. If all social areas with a non-charter group majority are compared (i.e. Types III-VI), the third block of data in Table 3 again shows greater segregation in the U.S.A. than elsewhere, but with a smaller gap between it and both England/Wales and New Zealand.

Turning to the more mixed areas with either a charter group or a non-charter group majority but with no single group predominant (Types II-III), the fourth block in Table 3 again clearly separates the two southern hemisphere countries from the two in North America. The former have substantially larger percentages of their urban populations living in the “more mixed” areas than the latter – with England/Wales closer to the North American than the southern hemisphere situation.

The last block in Table 3 presents inter-country differences in percentages living in all areas with a charter group majority (Types I-II). Each country has at least one urban area where the two combined comprise at least 98 per cent, but the U.S.A. has a very much lower minimum percentage at 9. Of the other countries, only New Zealand has an urban area with less than half of its population living in such areas: for the other three countries that percentage is close to two-thirds. The United States stand out as having a smaller mean percentage of its urban population living in such areas.

Across the five countries, therefore, these average data highlight a number of clear substantial (and statistically highly significant) differences in segregation levels in the distribution of the total urban population across the various type areas (separately or in combination). U.S. cities have by far the largest proportions of their populations living in areas where members of the ethnic minorities predominate – i.e. high levels of non-charter group segregation – whereas, on the other hand, Australia and New Zealand have the largest proportions living in ethnically-mixed residential milieux. Canadian, English/Welsh and U.S. cities also differ from those in the southern hemisphere by their high percentages living in Type I areas, where the charter group predominates: they also have much higher proportions living there than in the more mixed Type II areas – which is the case in Australia and New Zealand.

Variations across Urban Areas

Few studies have addressed in any detail – certainly so outside the U.S.A. – why levels of ethnic residential segregation vary among cities. Recent work on both the U.S.A. and New Zealand has identified strong relationships between levels of segregation and a small number of urban characteristics, however (Johnston et al 2004a, 2005). These suggest that the combined operation of the three sets of segregation-producing processes introduced above (discrimination, disadvantage and self-segregation) can result in ethnic group segregation levels that are more intense in some types of place than others. In particular, segregation of a minority group which is relatively disadvantaged in the three geographically-structured markets (labor, housing, education) is likely to be greater where its members form a large proportion of the urban population, and are thus in more intensive competition for jobs, housing and school places, than in urban areas where they form a relatively small proportion of the total and are (seen as) less of a threat. Such competition, and its spatial consequences, is likely to be enhanced in larger urban areas, and in places where several minority groups are competing not only among themselves but also with their host society.

These arguments are based on the work of, in particular, Blalock, who has been concerned with the role of residential segregation not only for its influence on inter-group relations (Blalock and Wilken, 1979) but also its implications for black-white relations in the U.S.A. (Blalock, 1979). Regarding the former, he argues that where a minority is relatively small “it is not likely to be noticed unless its behaviors are particularly offensive to the majority” (Blalock, 1982, 55) and its impact is most likely to be felt when, for example, there is relatively intense competition for resources – such as jobs and houses – motivating “discrimination, aggression” and other behaviors (p. 56). Large minority groups will probably pose a major threat to the dominant population, therefore, who will benefit more from segregation of the minority than would be the case in cities where the latter was relatively small. Blalock (1967, 219) expresses this formally as the following theoretical proposition:

To the degree that a fear of the minority’s power underlies prejudice, there should be a positive nonlinear relationship with an increasing slope between minority percentage and motivation to discriminate.

In addition, as both Hugo (1992) and de Vries (1974) argue, larger ethnic groups are more likely to have their own social infrastructure and generate residential separation, irrespective of charter group attitudes towards them (see also Ip, 2003; Ho and Bedford, 2003), whereas Wirth’s classic (1938) arguments linking urban size to potential alienation suggests that the larger the city the greater the benefits that residential clustering offer to a minority group.

These two sets of processes can be linked using Schelling’s (1969, 1971, 1978) classic models of segregation. He shows that the degree of segregation is likely to be greater than that desired by people. Members of group x may be prepared to tolerate half of the residents in their neighborhood being drawn from group y , for example, what he terms the limiting ratio. If members of y form more than half of their neighbors (i.e. exceed their “tipping point”: Schelling, 1972), members of x will move away – and over time, as his simulations (and many others undertaken since) show, this will generate a stable equilibrium position comprising two types of neighborhood, one of which is exclusively comprised of members of x and the others of members of

y. The actual level of segregation is greater than that “desired”. As the population of y increases in a city, there is likely to be a larger number of neighborhoods in which their percentage of the total exceeds x’s tipping point, thus stimulating high levels of segregation.

The summary statistics in Tables 2-3 provide clear evidence of significant differences across the five countries in the composition of social areas in their cities. Following the arguments above, however, these could reflect variations among the five countries in average urban size and the average size and diversity of their ethnic populations. Once these are held constant, the inter-country differences may be insignificant. To test whether this was the case the following model was fitted, using regression analysis:

$$\begin{aligned} PC_{ij} = & a + b_1 UP_i + b_2 CG_i + b_3 ENT_i \\ & + b_4 EW_i + b_5 NZ_i + b_6 A_i + b_7 C_i \\ & + b_8 (CG_i * EW_i) + b_9 (CG_i * NZ_i) + b_{10} (CG_i * A_i) \\ & + b_{11} (CG_i * C_i) +/- e_i \end{aligned} \quad (1)$$

where

PC_{ij} is the percentage of the population of city i living in residential area type j;
 UP_i is the total population of city i;
 CG_i is the percentage of the population of city i who are members of its charter group community;
 ENT_i is the entropy for city i, where entropy is defined as $ENT_i = -\sum (P_{ik} * \log P_{ik})$;
 P_{ik} is the proportion of ethnic group k in city i’s population;
 EW_i, NZ_i, A_i, C_i are dummy variables, coded 1 if city i is in England/Wales, New Zealand, Australia and Canada respectively and zero otherwise (thereby contrasting the four countries which have embraced multi-culturalism with the United States – the omitted category – which remains committed to assimilation); and
 $CG_i * EW_i, CG_i * NZ_i, CG_i * A_i$, and $CG_i * C_i$ are interaction variables involving the four country dummies and the charter group percentage.
(Dummy variables for each of the four countries were included rather than imposing a simple dichotomy of the U.S.A. – where the assimilation model prevails – and the remaining four – characterized by multi-culturalism. Such a binary split would prevent exploratory analyses of differences among those four, and degrees of freedom issues prevented inclusion of both categorizations.)¹⁶

This model is fitted to the data for all cities in all five countries to see whether it predicts segregation levels successfully: the inclusion of the dummy and interaction variables focuses particular attention on cross-national differences once the generic influences have been held constant. The first three regression coefficients establish the significance and substantive impact of variations in population size, relative size of the charter group community (as an inverse measure of the total size of the various ethnic communities), and diversity of a city’s ethnic population on levels of segregation, across all cities in all countries. The four dummy regression coefficients establish whether, once the generic variables have been held constant, there are (on average) differences between cities in each of four countries and those in the U.S. (whose cities are included in the constant term) in levels of segregation. Finally, the four interaction coefficients test whether there are differences between cities in each

of the four countries and those in the U.S. in the strength of the relationship between the relative size of the charter group and segregation levels.¹⁷

Scrutiny of scatter-graphs indicated considerable heteroscedasticity in some of the relationships: to take these into account and linearize the relationships, urban size was transformed to its base10 logarithm (logUP) and the percentage in the charter group was expressed as a logit transformation (logit%CG). In addition, significant outliers were identified in initial graphical explorations relating to five U.S. cities with charter group populations forming less than 25 per cent of the total and four Australian cities with very low levels of ethnic mix. Those nine were excluded from the regression analyses, which covered all cities having charter group populations between 25 and 90 per cent of the population total plus non-charter group populations exceeding 5000 persons.

The model was fitted using a stepwise framework, so that the relative importance of the generic and country-specific influences on segregation levels could be evaluated. The first stage fitted included the generic variables only (logUP, logit%CG and ENT); the second added the four dummy variables (EW, NZ, A and C); and the third added the interaction variables. Only the regression coefficients for the final stage are given here, but the R^2 values for each previous stage are reported to indicate the relative importance of each set of variables.

Regression results for types I-V are given in Table 4; Table 5 gives them for the combinations shown in Table 3. Coefficients significant at the 0.05 level or better are in bold. In nine of the cases, the goodness-of-fit statistic (R^2) indicates that at least 60 per cent of the variation across the 348 cities can be accounted for by the model; over 80 per cent is accounted for in five of the tests. Overall, the model is extremely successful, accounting on average for 74 per cent of the variation in the dependent variables – with the stage 1 R^2 values indicating that the generic variables predominated in accounting for variation across the cities in the percentages living in the more exclusive areas (Types I, V and VI). However, the stage 2-3 country-specific variables accounted for a much more substantial proportion of the variation in percentages living in the more mixed areas (II, III and IV).

Regarding the *three generic variables*, the clearest conclusion concerns the importance of the relative size of the charter group community as an influence on levels of residential segregation: eight of the ten coefficients for logit%CG in Tables 4-5 are significant at the 0.05 level or better. Seven are negative, indicating that the larger the charter group as a percentage of the urban population the smaller the percentage of the total population living in the Type II-V areas. Only one type deviates significantly from that trend: the charter group citadels (Type I). The larger the charter group, the larger the percentage of the urban population living in such areas.

Of the other two generic variables, the size of the city (logUP) is significant in seven regressions – with a positive sign in four of those cases: bigger cities tend to have larger populations living in the charter group citadels, holding other variables constant. Finally, there are nine significant relationships for the entropy variable, most of them negative, which means that in general the lower the level of ethnic diversity the greater the segregation.

These findings indicate a generic patterning of segregation across the five countries' urban areas. In part, this is unsurprising, given earlier findings for individual countries. As expected, segregation is greatest in large cities, in those where the charter group is a relatively small proportion of the total population, and where only a small number of ethnic groups is competing for residential space.

Of particular relevance to this comparative study are the coefficients for the four dummy and four interaction variables, included to explore whether there are significant *inter-country variations* in segregation levels (and their interactions with the main generic variable) once the generic variables are held constant. The comparator is the United States, which has the highest average segregation levels (Tables 2-3). There are three significant dummy variable coefficients each for cities in England/Wales and Canada, but 8 (out of 10) for Australian cities and nine for New Zealand – indicating clear differences between the southern hemisphere cities, on the one hand, and those in the U.S.A. on the other.

There is also a clear difference between the southern and northern hemisphere pairs of countries in their coefficients for the interaction terms, exploring inter-country differences in the strength of relationships. There are seven significant coefficients for the Australian cities (the majority positive) and eight for New Zealand (five negative and three positive), compared to only two for Canada and three for England/Wales. In general, the relationships for Australian cities are significantly steeper than is the case in the U.S.A.: there is a strong linear relationship in each country, but much steeper in the Australian case, hence the positive coefficient for the interaction term in the sixth regression in Table 4, whereas the lower average level of concentration in those areas for Australian cities is shown by the high negative dummy coefficient.

Variations in Segregation Levels II: Charter Groups

This section considers segregation levels for the charter groups, the population majority in most of the cities. Our null hypothesis, as before, is that any observed international differences may largely be a function of variations in city size and ethnic diversity – although this turns out not to be fully supported.

Table 6 shows the charter groups' distributions across types I-V and also the five type combinations used in Table 3, with all ten F-values from the ANOVAs indicating highly significant differences. Very small percentages only are found in the areas dominated by the minority groups (i.e. Types IV-VI), and slightly larger in the more ethnically-mixed Type III areas; the main differences relate to Types I-II, with the two southern hemisphere countries again standing out with much smaller proportions of their charter group populations living in Type I areas and many more than is the case in the northern hemisphere countries in the Type II areas where there is a larger non-charter group minority. This clear differentiation is further emphasized by the data in the right-hand column: Australian and New Zealand cities have much larger percentages of their charter group populations living in Type II-III areas combined and much smaller percentages in Type I areas as a percentage of those in Types I-II. Whereas Australian and New Zealand cities have on average 47.3 and 44.1 of their charter group residents living in areas where they form 30-80 per cent of the

population (i.e. Types II-III), for example, in the three northern hemisphere countries the comparable percentages lie within the range 22.7-27.4.

Regression analyses fitting model (1) focus on the Type I, II and III areas only. Table 7 reports very high stage 1 R^2 values, averaging 0.79, with the country-specific variables introduced in stages 2-3 also accounting for substantial proportions of the variation, especially those indicating inter-country variations in the slope of the relationship (stage 3). All four models have significant coefficients for the relative size of the charter group (logit%CG): the larger it is in relative terms, the greater the percentage of its members living in Type I areas and the smaller the percentage living in the more mixed areas – Type II and Types II and III combined. A similar pattern of significant coefficients for the entropy measure indicates greater concentration in the charter group citadels in the less diverse cities, while those for urban size indicate greater segregation in the larger cities.

Of particular interest, given the descriptive data in Table 6, are the significant coefficients for the Australia and New Zealand dummy variables in most of the regressions, which indicate substantial differences between cities there in the percentages of their charter groups living in relatively mixed residential areas and cities in the U.S.A. (and, by implication, because of the insignificant coefficients for them, England/Wales and Canada too). The two significant coefficients for New Zealand are negative, indicating smaller percentages in Type I and Type I-II areas combined than is the case for comparable places (similar size, charter group percentage, and ethnic diversity) elsewhere. Cities in the two southern hemisphere countries conform to the general pattern with regard to the influence of the generic variables, but their charter groups live in much less segregated residential areas on average than do those in the three northern hemisphere countries.

Variations in Segregation Levels III: The Ethnic Minority Groups

Table 8 gives descriptive statistics and F-values associated with ANOVA tests for the total non-charter group population in cities where it comprised both more than 5,000 persons and 5 per cent of the total population. The F-values are highly significant – all ten at the 0.001 level or better – indicating substantial differences across the five countries.

For the separate segregation types, the means show: more members of the non-charter group population (i.e. all ethnic minority groups combined) in Type V areas in the U.S.A. than elsewhere; many more ethnic minority residents in the mixed areas with a minority-majority (Type III) in New Zealand than in the other four countries; more ethnic minority residents in Type II areas with charter group majorities but substantial minority components in Australian and New Zealand cities; and at least twice as many members of ethnic minority groups living in Type I areas (where charter group members predominate) in England and Wales, Australia and Canada than in the U.S.A. and New Zealand. These differences are further substantiated by the data on combinations of types. U.S.A. cities, for example, have much larger shares of their ethnic minority populations living in areas where they form a large majority of the total (i.e. Types IV-VI) than do cities in the other four countries, although Canadian cities have more in Types V-VI than is the case in either New Zealand or

England/Wales, and New Zealand cities have many more of their non-charter group populations living in the relatively mixed areas (Types II-III).

These inter-country differences remain significant when the generic variables are held constant, as shown by the regression results in Tables 9-10; in those regressions, the variable $\text{logit}\%CG_i$ is replaced by $\text{logit}\%NCG_i$, the members of non-charter groups as a percentage of the total population in city i . In the regressions for the separate Types (Table 9), all but one of the 20 dummy regression coefficients for country is statistically significant, with the signs showing a very consistent pattern comprising two components. In the first, each of the four countries identified by the dummy variables – England/Wales, New Zealand, Australia, Canada – has a smaller percentage of its non-charter group population living in Types III-VI areas than is the case in U.S. cities, with the generic variables held constant; in the second, each of those countries has significantly larger percentages living in Type I and II areas than the U.S.A.. Similarly in the analyses of segregation type combinations (Table 10), all but one of the dummy regression coefficients for country is statistically significant – again with a consistent pattern to their signs: cities in the U.S.A. have larger shares of their ethnic minority populations living in various combinations of areas where ethnic minorities predominate (i.e. Types IV-VI) than is so in the other four countries, and less in both the more mixed areas (II-III) and those with charter group majorities.

These findings for the ethnic minority (i.e. non-charter group) populations treated as a whole indicate very clear differences between U.S. cities and cities in the other four countries. Holding constant the generic variables (as before, segregation tends to be greater, the larger the non-charter group population as a percentage of the total and the less ethnically diverse that non-charter group) U.S. cities tend to be much more segregated; members of their non-charter group population are more likely to live in areas where they are in a majority than is the case in the other four countries, just as (with the exception of Canada) members of their charter group are more likely to live in areas where they predominate

There is a major problem when it comes to analysis of individual ethnic groups, however, because few meet our size thresholds (a group population of 5,000 or more, comprising at least 5 per cent of the city's total population) in other than a small number of places. There are, for example, only three places in England/Wales where Blacks meet both size thresholds, and one in Canada; similarly Pacific Islanders meet the thresholds in just two New Zealand cities, as is also the case for Pacific Peoples in one Australian city. Indeed, apart from the 14 New Zealand cities where Maori meet the size thresholds,¹⁸ the only viable comparative situation which allows testing of the regression model deployed here relates to Asians.

The Segregation of Asians

Table 11 gives summary data for the segregation types and combined types for the Asian populations in the five countries' cities where they meet the threshold criteria. Most of the significant F-values associated with the ANOVA tests refer to differences in the percentages of Asians living in either the more mixed types (II-III) or the "charter group citadels" (I). Asians in England and Wales, Canada and the U.S.A. are less likely to live in either of the areas with charter group majorities (I-II) than is the case in Australia and New Zealand. The difference between the cities of the northern

and southern hemispheres is once more apparent – though Australian cities have very few Asians living in Type I areas.

The regression analyses fitting model (1) were largely unsuccessful, and are not presented here. The R^2 values indicated that inter-country variations are only substantial with regard to the percentages of Asians living in Type I-III areas. Secondly, the dummy and interaction variable coefficients indicate that this is entirely because of differences between the average situation in Australia and the United States – and, by implication, between Australia and England/Wales, New Zealand and Canada too. Australian cities have more Asians living in either Types II-III or Types I-II combined than is the case elsewhere, but fewer living in Type I areas relative to all areas with a charter group majority (I-II). Finally, as in all of the other tests of model (1) reported here, the main relationship with one of the generic variables relates to the group's size. The larger the Asian population as a percentage of the urban total, the greater the proportion of Asians there living in areas with a non-charter group majority and, complementing that, the smaller the proportion living in areas where the charter group dominates.

Other Ethnic Groups

For the other ethnic groups, the small number of places in which they meet the criteria deployed here precluded regression analysis.¹⁹ To provide some comparison, each city which met the criteria for any ethnic group has had that group's distribution across the segregation types contrasted with the situation in U.S. cities selected to be directly comparable in their size and ethnic composition.

Three cities in England/Wales met the threshold criteria for Blacks – London, Birmingham and Luton are compared in Table 12 with U.S. cities of similar size and Black population share. London is compared with San Francisco and Washington DC: many more of its Blacks live in charter-group-dominated areas (Types I-II) than in either American city, both of which have substantial percentages in Types V-VI areas whereas London has none. Birmingham is compared with Albany (NY), which has a similar small percentage of Blacks in its population, 30 per cent of whom live in areas where Blacks predominate, compared to only 4 per cent in the British city. Finally, Luton is compared with Elkhart (IN), and the contrast is very similar. Blacks in cities in England/Wales are much less segregated than are those in comparable places in the U.S.A.. The same is true when comparing Toronto with Pittsburgh: half of Pittsburgh's Blacks live in ghetto-like situations, compared to none in the Canadian city.

Comparing the segregation of Maori in New Zealand's largest cities with that of Blacks in U.S. cities of similar size and ethnic composition also shows much greater segregation in the latter. Auckland differs from both Oklahoma City and Louisville, for example, by having no Maori in Type VI areas whereas the American pair have 35-56 per cent of Blacks living in such neighborhoods. The differences between Christchurch and Wellington in New Zealand and Peoria (IL) and Huntsville (AL) in the U.S.A. are even greater, with most Maori in the former pair living in charter-group-dominated areas: the same differences occur between Hamilton, Dunedin and Tauranga, on the one hand, and Dothan (AL), Elmira (NY) and Gadsden (AL), on the other.

Only three other cities outside the U.S.A. have ethnic communities comprising more than 5,000 people and more than 5 per cent of the urban population: Auckland and Wellington in New Zealand and Sydney in Australia.²⁰ In each case, the ethnic minority comprises Pacific Islanders, most of whom are relatively recent, low status migrants; their residential distributions are compared with those of Hispanics in U.S. cities – another group most of whose members are recent, low status arrivals. The comparisons of Auckland with West Palm Beach (FL) and Hartford (CT) indicate that more Pacific Islanders in Auckland live in relatively mixed areas than do Hispanics in the two U.S. cities; the same is the case for Wellington when compared with Reading (PA) and Beaumont (TX). Once again, segregation is greater in the U.S. cities. This is not the case with the final comparison, however – between Sydney and Seattle, which have just over 5 per cent of their populations classified as Pacific Islanders and Hispanics respectively. In this case, whereas most of Sydney's Pacific Islanders live in relatively mixed areas, two-thirds of Seattle's Hispanics live in white-dominated districts.

Conclusions

This article has reported some of the first rigorous cross-national analyses of ethnic residential segregation, certainly the first to compare the situation in five separate countries. It has presented descriptive data and statistical tests which have identified both common factors in the pattern of segregation across cities in all five countries plus country-specific deviations from those generic influences. These findings apply to the distribution of the total urban population across the segregation area types (and combinations of those types), as well as to the distributions of each country's charter group and individual ethnic minority groups.

The first overall conclusion is that the degree of segregation in the cities of the five countries is to a considerable extent a function of common processes – discrimination, disadvantage and self-segregation – that nevertheless operate differentially, in terms of the intensity of their outcomes, in different types of place. Defining segregation as the degree to which groups within urban society live apart from each other, analyses of the total population show greater segregation (higher proportions of the population living in the more exclusive residential areas – I, IV-VI – dominated by either charter group members or members of ethnic minorities) in larger cities, in places with large, non-charter-group populations, and in places with less ethnic mix (i.e. where only a small number of ethnic groups is competing for residential space). Similar findings relate to both the charter groups – studied separately from the total population – and the ethnic groups when these are analyzed both collectively and separately. The regression models show that segregation (living in exclusive rather than relatively mixed residential areas) is almost invariably greater in large cities and in cities where ethnic minority groups form a large proportion of the total population.

The second conclusion is that there are significant across-country variations around these general trends. In part these reflect the situation of the individual ethnic groups studied: Blacks in the U.S. are more segregated than any other group, for example. In part, too, they reflect differences in the migration processes under-pinning the situations of various ethnic groups. South Asians in the U.K. – many of whom work in relatively low status, poorly-paid occupations – are for example more segregated

than Asians in the other four countries, many of whom have relatively affluent backgrounds and are employed in relatively high status occupations.

The final conclusion, which directly addresses the first question posed here – *are there variations across the five countries in levels of ethnic residential segregation?* – is that there are substantial differences among the five countries, especially between the two southern and three northern hemisphere countries. Holding constant the generic variables, ethnic residential segregation – including segregation of the charter groups – is generally less pronounced in Australia and New Zealand than in Canada, England/Wales and the United States of America. Individuals and households from all ethnic minority backgrounds are more likely to be living in relatively mixed residential milieux in Australian and New Zealand cities than are their contemporaries in the three northern hemisphere countries. The reasons for this undoubtedly rest in part on the multi-cultural policies enacted in Australia and New Zealand – but Canada and England/Wales are also both officially multi-cultural polities, which suggests that other factors are also in play. The relative openness of Australian and New Zealand societies is almost certainly important here, although both have significant blemishes in the treatment of their “first nations”. With those exceptions, relative prosperity in Australia and New Zealand over recent decades has enabled economic success and spatial assimilation for many immigrants, who have encountered relatively few social and cultural barriers to their desires.

Differences between national policies relating to assimilation and multiculturalism offer little by way of explanation for the variations in segregation levels across the cities of the five countries analyzed here – as Peach (2006a) found for the U.S.A. and Canada. This final conclusion is to some extent paradoxical, because it indicates that the country where the assimilation model prevails (at least in much popular rhetoric) has higher levels of segregation than is the case in the four others, where multi-culturalism is the explicit policy and higher levels of segregation reflecting self-segregation processes could have been anticipated. Such American exceptionalism reflects the contemporary situation with regard to the two largest ethnic minority groups identified by the census – Blacks and Hispanics. These, unlike the earlier arrivals from Europe in American cities, have not experienced the full spatial assimilation process: as Walks and Bourne (2006, 276, after Marcuse 1997), express it, “a new form of ‘outcast ghetto’ (distinguished from the ghetto of old) may be emerging in U. S. cities, composed of only the poorest segments of subjugated racialized groups (mostly Blacks and Hispanics) who are marginal to current production needs”.

The spatial assimilation model is based on a process of economic assimilation: if that is not operating, then residential segregation will be considerable, reflecting continuing disadvantage if not discrimination (the latter indicating considerable antagonism among many whites against, especially, Blacks, associated with fears of close inter-group contact), probably buttressed by strong self-segregation tendencies by Blacks and Hispanics. Earlier migrant streams to U.S. cities have achieved economic assimilation and their ethnic enclaves have largely disappeared, and the same may develop for later streams – such as the recently-arrived Asians. Similar processes are occurring in several of the other countries studied here, notably Australia and New Zealand where, despite the multi-culturalism policies, members of many ethnic groups have chosen – relatively soon after their arrival – to capitalize on

their economic success and move into more integrated neighborhoods (Poulsen et al 2004). Groups such as the New Zealand Maori, the South Asian migrants in England/Wales, and some Blacks and Latin Americans in Canadian cities (Walks and Bourne 2006) have been economically less successful, and so are more likely to be found in areas where members of their minority group dominate. Even so, their levels of segregation are lower than those of Blacks and Hispanics in the U.S.A. (Johnston et al 2006a), suggesting higher levels of disadvantage in the latter, probably associated with greater desire for self-segregation and (for Blacks at least) remnants of housing market discrimination. In the contemporary world, therefore, residential segregation is higher for the two largest American ethnic groups than it is for similar groups elsewhere.

This conclusion regarding the apparent paradoxical situation of greater segregation in U.S. cities than in those of the other four countries undoubtedly also reflects the nature of the data available. Because the focus in four of the national censuses is on ethnicity (the exception is Australia), researchers are dependent on the categories deployed in those data-collection exercises. In New Zealand, the U.K. and the U.S.A. separate data are only collected for particular ethnic-racial groups – basically non-white groups – which therefore precludes study of “white minorities”.²¹ Ethnic categories are not neutral (as argued in Robbin, 1999, 2000a, 2000b).²² Thus the comparisons presented here between the U. S. and the four other countries are dominated by situation of Blacks and, to a lesser extent, Hispanics in the former, whose experience is not typical of that for many other ethnic minorities who emigrated to U.S. cities in large numbers during the twentieth century.²³ Nevertheless, it is clear that groups that have suffered similar levels of economic disadvantage as Blacks in the U.S. – such as the Maori and Pacific Islanders in New Zealand and South Asians in England and Wales – are currently experiencing far less residential segregation than is the case for their American contemporaries: the assimilation model is not universally applicable in the country in which it was developed.

As the example in the previous paragraph indicates, international comparative studies are generally beset by difficulties regarding the commensurability of the data employed and the national context. With regard to data, for each of the five countries we have used census material published at the smallest spatial scales, which are generally commensurate (though the New Zealand meshblocks are considerably smaller on average than the units for the other four countries – which might have been expected to result in higher levels of observed segregation there). In addition, in four countries data on ethnicity are derived from self-identification questions, within the categorizations deployed by the various census bureaux; for Australia, however, such data are not collected and we have had to rely on a synthetic variable combining information on birthplace and ancestry, which makes some of the comparisons slightly less rigorous than the ideal. Nevertheless, the overall trend of the results is clear-cut and suggests findings that are robust; patterns of segregation across the five countries are related to a small number of generic factors, but in general these produce higher levels of segregation in cities in Canada, England/Wales and, especially, the United States of America than in Australian and New Zealand urban areas.

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Notes

¹ This is the case in work on Canadian cities (see Balakrishnan 2000; Balakrishnan et al 2005; although see Fong and Wilkes 1999) as well as the U.K. (Johnston et al 2002). In the U.S.A., as Johnston et al (2004) point out, most analyses of inter-metropolitan differences have similarly lacked rigorous comparative analyses – although see Allen and Turner (2005), Cutler et al (1999), Cutler and Glaeser (1997), Frey and Farley (1996), Iceland et al (2002), Johnston et al (2006).

² An official Australian document refers to multiculturalism there as recognizing ‘Australia’s cultural diversity. It accepts and respects the rights of all Australians to express and share their individual cultural heritage within an overriding commitment to Australia to Australia and the basic structures of Australian democracy’ while seeking to promote ‘social harmony among the different cultural groups in our society’ (DIMIA, 2003).

³ These terms are used interchangeably in the text: the urban/metropolitan area and city definitions deployed are those produced by the relevant national census bureaux for data dissemination. The urban areas used are those defined by the various census bureaux: for England and Wales they are the separate built-up areas and not the administrative units (some of which incorporate several urban places) defined by the National Statistics Office; for the U.S.A. they are the CMSAs (Combined Metropolitan Statistical Areas) or MSAs (Metropolitan Areas) defined by the Bureau of Census; for Canada the Metropolitan Areas defined by Statistics Canada; for New Zealand urban places defined by Statistics New Zealand; and for Australia UCLs (Urban Centre Localities) defined by the Australian Bureau of Statistics.

⁴ There is also a tradition in those countries of academic investigations of segregation and the immigrant experience based on the classic work of the 1920s Chicago School of Urban Sociology.

⁵ In the US context, for example, Goldberg (1998) contrasts two aspects of segregation because of disadvantage – what he terms the ‘new segregation’: a process of locking people in to certain types of neighborhood whereas under the ‘old segregation’ they were locked out of many areas.

⁶ On the role of voluntary segregation, see the results of a major simulation exercise by Fossett (2006) – and the subsequent discussion in the same issue of that journal – which suggests that high levels of segregation are entirely consistent with high levels of voluntary self-segregation –without either discrimination or disadvantage in the housing market: disproportionate ‘in-group preferences’ for living close to one’s co-ethnics and distancing oneself from both the ‘charter group’ and other minority groups are ‘segregation-promoting not integration-promoting’ according to Fossett (2006, 258). See also Trudeau (2006).

⁷ Ellis et al (2006) have suggested that part of this assimilation process can be related to inter-ethnic group partnering: in Los Angeles, immigrants with partners from a different ethnic group than themselves are less likely than those whose partner is from the same ethnic group to live in segregated enclaves. Somewhat similarly, Johnston et al (2006c) have shown that people who claim a mixed ethnicity in the U.K. are less likely to live in relatively segregated areas than those who identify with one of the country’s main ethnic groups.

⁸ For example, such difficulties have led to some reconsideration of the bases of multi-culturalism. In a major speech in December 2006 the U.K. Prime Minister, Tony Blair, not only claimed that ‘...the right to be in a multicultural society was always, always [sic] implicitly balanced by a duty to integrate, to be part of Britain’ but also concluded that ‘Our tolerance is part of what makes Britain, Britain. So conform to it; or don’t come here’. The full text is <http://www.number10.gov.uk/output/Page10563.asp>.

⁹ There is no evidence of any spatial segregation of the aboriginal population (defined in the census as those of Aboriginal and Torres Island descent) in Australian cities, so they are not considered further here.

¹⁰ Bangladesh became a separate country after the initial waves of Bengali immigrants from East Pakistan (Dench, Gavron and Young 2006). On the situation of Muslim migrants in the U.K. – many of whom are from Pakistan and Bangladesh – see Peach (2006b).

¹¹ The other reasons include comparability over space and time. Most of the indices are not standardized – indeed, with the exception of the index of isolation, standardization procedures have not been developed (see Cutler et al 1999; Noden 2000) – and are very much a function of a group’s size relative to the number of unit areas. Thus comparing the degree of segregation between two groups in

the same city at the same census, one of which forms 15 per cent of the total population and the other 2 per cent, is not straightforward; nor is a comparison of the distribution of one group at two dates if it forms 5 per cent of the total at the first and 12 per cent at the second – even if the unit areas stay the same. (For an example of these problems, see Clark, 2007.)

¹² There is room for further exploration of this claim, but we have no reason to suspect that our findings are particular to the chosen boundaries.

¹³ Scotland had to be omitted because it has a separate census reporting architecture.

¹⁴ The Australian, Canadian and US first nation groups are not studied here because of their small numbers and the absence of visible segregation within the country's cities.

¹⁵ The entropy index is defined as $ENTROPY_j = -\sum_i [PERCENT_{ij} * \text{LOG}_e(PERCENT_{ij})]$ where $PERCENT_{ij}$ is the size of ethnic group i in metropolitan area (MA) j as a percentage of the total MA population; and $ENTROPY_j$ is the measure of entropy for MA j .

¹⁶ It has been suggested by one referee that it is improper to use OLS regression when testing such a model because the spatial clustering of the observations could have an impact on the error terms. The nature of the model – comparing five countries – means that in one sense spatial clustering is built-in to the entire research programme, and is taken into account by the dummy variables introduced at stage 2 of the model. Regarding spatial clustering within the individual countries – if there is any – this would only be relevant if there are spatial processes operating so that near places are more alike than more distant places in their segregation levels. We do not specify any such processes, and treat each observation (city) as an independent entity, hence the use of OLS.

¹⁷ That set of interaction terms, rather than others linking country to urban size and/or entropy, was selected after initial exploration of a range of models. Charter group size is the dominant determinant of segregation levels among the three generic variables, as indicated in the results discussed below.

¹⁸ For comparisons between the situation of the Maori in New Zealand and Blacks in the U.S.A., see Johnston et al (2004b, 2006b)

¹⁹ Comparisons of the situations of Blacks in the U.S.A. and Maori in New Zealand are feasible, though difficult because of the small size of most New Zealand urban areas; they are reported in Johnston, Poulsen and Forrest (2004, 2006b). Similarly it is possible to conduct formal analyses within individual countries – notably the U.S.A. (on which see the comparisons of Black and Hispanic segregation levels in Johnston, Poulsen and Forrest 2006a)

²⁰ We have omitted Australians classified as of European ancestry, virtually all of whom (the exceptions are in Adelaide, Melbourne and Sydney) live in type I-II areas, and for whom there are no direct comparisons in other countries.

²¹ It is, of course, possible to use birthplace data – as Peach (2006a) does – but these have major problems as the Australian data deployed here indicate (see also Poulsen et al, 2004).

²² For a comparable argument in the U.K. see the article in *The Times* by columnist Matthew Parris at <http://www.timesonline.co.uk/article/0,,1065-2490974.html>.

²³ For a comparison of the situations for Blacks and Hispanics in the US, see Johnston et al (2006a).

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Table 1. Summary statistics for the populations of the cities analysed in the five countries

	Min	Max	Mean	SD
United States of America (N=223)				
Population	57,813	21,199,560	853,814	2,108,665
White percentage	4.9	94.5	74.3	16.7
Black percentage	0.2	50.8	11.4	11.3
Hispanic percentage	0.6	94.3	9.8	15.1
Asian percentage	0.3	45.3	2.1	3.3
ENTROPY	1.33	0.21	0.62	0.27
England/Wales (N=46)				
Population	22,679	8,278,251	271,858	954,218
White percentage	66.0	94.9	85.7	8.0
Black percentage	0.1	9.6	1.8	1.8
South Asian percentage	1.0	30.4	9.9	7.4
ENTROPY	0.73	0.20	0.46	0.13
New Zealand (N=17)				
Population	14,175	1,068,381	149,279	256,112
NZ European percentage	59.9	89.1	76.4	9.2
Maori percentage	5.6	40.0	19.6	9.9
Pacific Island percentage	1.3	19.1	4.8	4.9
Asian percentage	1.6	13.9	4.2	3.2
ENTROPY	1.11	0.48	0.78	0.18
Canada (N=14)				
Population	143,865	4,632,465	1,125,300	1,333,796
White percentage	61.3	89.1	81.1	8.8
Black percentage	0.4	6.7	2.1	1.7
Hispanic percentage	0.4	1.6	0.8	0.4
Asian percentage	3.6	33.9	11.2	8.8
Indigenous percentage	0.3	9.9	3.7	3.2
ENTROPY	0.90	0.42	0.60	0.14
Australia (N=51)				
Population	17,641	3,847,287	327,941	774,814
White percentage	56.8	86.4	78.2	6.7
European percentage	8.1	24.0	13.2	4.2
Middle Eastern percentage	0.1	5.1	0.5	0.8
Pacific percentage	0.3	4.0	1.0	0.9
Asian percentage	0.8	14.0	2.7	2.6
ENTROPY	1.16	0.51	0.71	0.15

Table 2. Summary statistics for the distribution of the total population in the cities analysed across the six segregation types

	Min	Max	Mean	SD	N
Type VI (F = 21.3***)					
United States	0.0	55.7	10.8	12.0	219
England/Wales	0.0	19.4	1.7	4.5	46
New Zealand	0.0	0.0	0.0	0.0	17
Australia	0.0	1.5	0.1	0.2	51
Canada	0.0	19.0	1.4	5.1	14
Type V (F = 4.8**)					
United States	0.0	22.3	1.9	2.7	219
England/Wales	0.0	7.2	1.6	2.1	46
New Zealand	0.0	11.4	1.8	2.7	17
Australia	0.0	3.2	0.2	0.6	51
Canada	0.3	14.3	2.1	3.9	14
Type IV (F = 8.7***)					
United States	0.0	15.0	1.4	2.4	219
England/Wales	0.0	18.6	3.3	4.8	46
New Zealand	0.0	11.0	2.9	3.7	17
Australia	0.0	18.8	0.3	1.7	51
Canada	0.1	3.5	0.5	0.9	14
Type III (F = 17.1***)					
United States	0.1	30.0	5.9	4.5	219
England/Wales	0.1	18.8	5.8	4.0	46
New Zealand	0.1	40.6	12.0	10.9	17
Australia	0.0	20.6	1.4	4.2	51
Canada	1.0	14.3	4.1	4.6	14
Type II (F = 30.9***)					
United States	2.5	58.7	21.7	10.0	219
England/Wales	5.8	63.7	25.8	13.1	46
New Zealand	2.5	58.7	42.7	9.5	17
Australia	0.6	100.0	46.8	32.5	51
Canada	13.7	37.1	24.5	7.5	14
Type I (F = 3.1*)					
United States	0.3	95.3	55.7	22.1	219
England/Wales	22.1	84.3	61.8	16.6	46
New Zealand	5.3	77.7	40.6	20.4	17
Australia	0.0	99.4	51.3	34.3	51
Canada	30.4	85.0	67.5	16.8	14

Min – minimum percentage; Max – maximum percentage; SD – standard deviation; N – number of cities

*** statistically significant at the 0.001 level or better; ** statistically significant at the 0.01-0.001 level; * statistically significant at the 0.05-0.01 level

Table 3. Summary statistics for the distribution of the total population in the cities analysed across combinations of the six segregation types

	Min	Max	Mean	SD	N
V + VI (F = 24.9***)					
United States	0.1	56.5	12.6	12.0	219
England/Wales	0.0	19.4	3.3	5.1	46
New Zealand	0.0	11.4	1.8	2.7	17
Australia	0.0	3.2	0.2	0.6	51
Canada	0.0	19.5	3.4	6.1	14
IV + V + VI (F = 19.9***)					
United States	0.0	57.2	14.1	12.8	219
England/Wales	0.0	21.0	6.6	7.4	46
New Zealand	0.1	14.7	4.7	4.8	17
Australia	0.0	12.9	0.5	2.2	51
Canada	0.0	19.6	3.9	6.5	14
III + IV + V + VI (F = 19.3***)					
United States	0.3	70.8	20.0	15.9	219
England/Wales	0.1	33.3	12.4	10.0	46
New Zealand	0.6	51.6	16.7	14.9	17
Australia	0.0	32.3	1.9	6.2	51
Canada	0.4	33.1	8.0	10.9	14
II + III (F = 20.3***)					
United States	3.0	71.4	27.6	13.4	219
England/Wales	9.1	74.3	31.5	14.4	46
New Zealand	22.2	83.8	54.6	16.7	17
Australia	0.6	100.0	48.2	33.7	51
Canada	14.6	49.9	28.6	11.2	14
I + II (F = 25.5***)					
United States	9.1	97.8	77.4	16.2	219
England/Wales	66.7	99.9	87.6	10.0	46
New Zealand	48.4	99.4	83.2	14.9	17
Australia	67.7	100.0	98.1	6.2	51
Canada	67.0	99.6	92.0	10.9	14

Min – minimum percentage; Max – maximum percentage; SD – standard deviation; N – number of cities

*** statistically significant at the 0.001 level or better; ** statistically significant at the 0.01-0.001 level; * statistically significant at the 0.05-0.01 level

Table 4. Regressions for the distribution of the total population across the segregation types (standard errors in brackets)

Dependent	Percentage of the Total Population Living in Area Type				
	V	IV	III	II	I
a	-2.7 (1.3)	-1.1 (1.3)	7.4 (1.8)	52.5 (7.6)	8.7 (6.1)
logUP	0.3 (0.2)	1.7 (0.2)	-0.2 (0.3)	-5.0 (1.3)	4.0 (1.0)
logit%CG	0.2 (0.2)	-0.3 (0.2)	-3.6 (0.3)	-7.1 (1.4)	28.0 (1.1)
Entropy	4.1 (0.6)	3.9 (0.6)	5.3 (0.8)	8.1 (3.3)	-8.4 (2.6)
E/W	5.4 (3.4)	30.1 (3.4)	12.7 (4.6)	-1.4 (19.6)	7.3 (15.8)
NZ	8.0 (4.1)	19.6 (4.1)	66.0 (5.6)	11.3 (23.9)	-38.1 (19.3)
Australia	-3.2 (3.3)	-0.5 (3.3)	10.5 (4.5)	286.5 (19.1)	-232.7 (15.4)
Canada	-4.1 (0.6)	-6.0 (5.0)	18.0 (6.8)	29.6 (29.1)	-23.3 (23.5)
Eng*%CG	0.01 (0.04)	-0.33 (0.04)	-0.13 (0.06)	0.01 (0.24)	-0.17 (0.19)
NZ*%CG	-0.11 (0.05)	-0.23 (0.05)	-0.79 (0.07)	0.01 (0.31)	0.29 (0.25)
Aust*%CG	0.01 (0.04)	0.00 (0.05)	-0.18 (0.06)	-3.37 (0.25)	2.87 (0.20)
Can*%WG	-0.22 (0.06)	0.01 (0.06)	-0.22 (0.08)	-0.28 (0.36)	0.26 (0.29)
R ²					
Stage 1	0.24	0.28	0.52	0.21	0.70
Stage 2	0.29	0.45	0.69	0.33	0.73
Stage 3	0.33	0.55	0.77	0.66	0.86

Significant regression coefficients at the 0.05 level or better are shown in bold

Table 5. Regressions for the distribution of the total population across combinations of the six segregation types (standard errors in brackets)

Dependent	Model				
	A	B	C	D	E
a	38.1 (3.2)	27.9 (3.1)	35.3 (3.1)	59.9 (14.0)	61.2 (2.9)
logUP	-0.2 (0.5)	1.5 (0.5)	1.4 (0.5)	-5.2 (1.3)	-1.0 (0.5)
logit%CG	-17.1 (0.6)	-17.3 (0.6)	-21.0 (0.6)	-10.8 (1.4)	20.9 (0.5)
Entropy	-10.4 (1.4)	-6.5 (1.3)	-1.2 (1.4)	13.4 (3.2)	0.2 (1.3)
E/W	-44.7 (8.3)	-14.6 (8.0)	-2.0 (8.3)	11.2 (19.5)	5.9 (7.5)
NZ	-53.9 (10.1)	-34.3 (9.8)	31.8 (10.1)	77.3 (23.8)	-26.9 (9.2)
Australia	-60.4 (8.0)	-60.9 (7.8)	-50.4 (8.1)	297.0 (19.0)	53.8 (7.3)
Canada	-15.5 (12.3)	-21.5 (11.9)	-3.4 (12.3)	47.7 (29.0)	6.3 (11.2)
Eng*%CG	0.52 (0.10)	0.19 (0.10)	0.10 (0.10)	-0.01 (0.24)	-0.01 (0.09)
NZ*%CG	0.63 (0.13)	0.40 (0.13)	-0.39 (0.13)	-0.72 (0.31)	0.37 (0.12)
Aust*%CG	0.67 (0.11)	0.68 (0.10)	0.49 (0.10)	-3.55 (0.24)	-0.50 (0.09)
Can*%CG	0.18 (0.15)	0.24 (0.15)	0.01 (0.15)	-0.50 (0.36)	-0.01 (0.14)
R ²					
Stage 1	0.72	0.77	0.81	0.33	0.72
Stage 2	0.77	0.82	0.89	0.32	0.91
Stage 3	0.82	0.86	0.91	0.72	0.93

Key to models (combinations of types): A – V + VI; B – IV + V + VI; C – III + IV + V + VI; D – II + III; E – I + II.

Significant regression coefficients at the 0.05 level or better are shown in bold

Table 6. Summary statistics for the distribution of the charter groups across the segregation types

	Mean	SD		Mean	SD
V (F = 5.4***)			V + VI (F=13.2***)		
United States	0.5	0.7	United States	3.8	3.5
England/Wales	0.4	0.5	England/Wales	0.9	1.5
New Zealand	0.6	1.1	New Zealand	0.6	1.1
Australia	0.5	0.2	Australia	0.1	0.2
Canada	0.6	1.1	Canada	1.0	2.1
IV (F = 9.4***)			IV + V + VI (F = 10.2***)		
United States	0.4	0.8	United States	3.2	3.8
England/Wales	1.4	2.4	England/Wales	2.3	2.7
New Zealand	1.1	1.5	New Zealand	1.7	1.8
Australia	0.1	0.7	Australia	0.2	0.9
Canada	0.2	0.3	Canada	1.2	2.2
III (F = 10.2***)			III + IV + V + VI (F=11.1***)		
United States	4.3	4.3	United States	7.5	7.7
England/Wales	3.4	2.5	England/Wales	5.7	4.7
New Zealand	1.1	1.5	New Zealand	2.7	3.2
Australia	0.9	2.9	Australia	1.1	3.7
Canada	2.3	3.1	Canada	3.5	5.2
II (F = 22.7***)			II + III (F=13.4***)		
United States	23.1	13.2	United States	27.4	16.9
England/Wales	23.7	13.7	England/Wales	27.1	15.1
New Zealand	43.0	11.7	New Zealand	44.1	12.4
Australia	46.4	26.8	Australia	47.3	33.8
Canada	20.4	9.3	Canada	22.7	12.0
I (F = 10.6***)			I + II (F=10.5***)		
United States	69.4	19.7	United States	92.5	7.7
England/Wales	70.6	16.2	England/Wales	94.3	4.7
New Zealand	46.9	19.9	New Zealand	89.9	10.5
Australia	52.5	34.0	Australia	98.9	3.9
Canada	76.1	13.8	Canada	96.5	5.2

*** statistically significant at the 0.001 level or better; ** statistically significant at the 0.01-0.001 level; * statistically significant at the 0.05-0.01 level

Table 7. Regressions for the distribution of the charter groups across certain segregation types and type combinations (standard errors in brackets)

Dependent	Percentage of the Charter Group living in Area Type(s)			
	II	I	I+II	II+III
a	44.9 (6.8)	41.8 (6.9)	86.6 (2.9)	49.7 (7.0)
logUP	-4.9 (1.1)	5.3 (1.2)	0.4 (0.4)	-5.0 (1.2)
logit%CG	-8.9 (1.4)	16.5 (1.4)	7.5 (0.5)	-12.3 (1.4)
Entropy	24.9 (3.6)	-32.1 (3.7)	-7.2 (1.2)	30.9 (3.7)
E/W	-8.7 (17.7)	9.2 (18.2)	0.5 (6.0)	-9.5 (18.3)
NZ	10.1 (21.6)	-49.0 (22.0)	-38.9 (7.2)	-7.1 (22.1)
Australia	295.1 (18.7)	-269.0 (19.0)	26.2 (6.3)	284.4 (19.1)
Canada	16.1 (25.7)	-18.9 (26.4)	-2.8 (8.7)	20.7 (26.6)
Eng*%CG	0.18 (0.22)	-0.22 (0.23)	0.01 (0.107)	-0.30 (0.23)
NZ*%CG	0.01 (0.28)	0.43 (0.28)	0.48 (0.09)	0.23 (0.29)
Aust*%CG	-3.50 (0.24)	3.24 (0.24)	-0.26 (0.08)	-3.42 (0.24)
Can*%CG	-0.15 (0.32)	0.18 (0.32)	0.01 (0.10)	-0.21 (0.33)
R ²				
Stage 1	0.43	0.61	0.68	0.53
Stage 2	0.49	0.65	0.77	0.56
Stage 3	0.76	0.81	0.80	0.78

Significant regression coefficients at the 0.05 level or better are shown in bold

Table 8. Summary statistics for the distribution of the combined non-charter groups across the segregation types and type combinations

	N	Mean	SD	Mean	SD
V (F = 7.0***)				V + VI (F = 44.7***)	
U.S.A.	260	5.5	6.5	30.3	22.7
England/Wales	71	4.5	7.2	8.2	14.0
NZ	17	4.8	5.7	4.8	5.7
Australia	51	0.4	1.0	0.5	1.3
Canada	21	4.5	8.0	6.2	11.0
IV (F = 12.5***)				IV + V + VI (F = 39.3***)	
U.S.A.	260	3.1	4.4	33.3	23.2
England/Wales	71	6.9	10.3	15.2	18.7
NZ	17	7.3	8.0	12.1	10.3
Australia	51	0.5	2.8	1.0	3.6
Canada	12	1.0	2.0	7.3	11.9
III (F = 68.8***)				III + IV + V + VI (F = 40.7***)	
U.S.A.	260	10.4	5.4	43.9	24.5
England/Wales	71	12.5	9.4	27.6	25.2
NZ	17	39.2	25.9	51.3	33.0
Australia	51	2.1	5.7	3.1	8.9
Canada	21	7.0	7.4	14.3	18.3
II (F = 41.1***)				II + III (F = 45.6***)	
U.S.A.	260	24.2	9.1	34.6	11.8
England/Wales	71	32.4	13.1	44.8	16.9
NZ	17	48.3	11.8	87.5	18.7
Australia	51	50.1	31.8	52.2	33.5
Canada	21	33.6	14.3	40.65	18.7
I (F = 40.6***)				I + II (F = 124.1***)	
U.S.A.	260	18.6	12.9	42.8	17.4
England/Wales	71	40.0	25.8	72.4	25.2
NZ	17	18.0	13.5	66.3	22.2
Australia	17	46.7	34.6	96.9	8.9
Canada	21	52.1	25.6	85.7	18.3

SD – standard deviation; N – number of cities

*** statistically significant at the 0.001 level or better; ** statistically significant at the 0.01-0.001 level; * statistically significant at the 0.05-0.01 level

Table 9. Regressions for the distribution of the combined non-charter groups across the segregation types (standard errors in brackets)

Dependent	Percentage of the Non-Charter Group living in Area Types				
	V	IV	III	II	I
a	-5.2 (3.7)	-23.3 (2.7)	5.8 (3.5)	34.6 (7.2)	13.6 (6.7)
logUP	0.3 (0.7)	3.7 (0.5)	-0.4 (0.6)	-5.0 (1.3)	-1.0 (1.2)
logit%NCG	-2.5 (0.5)	-1.1 (0.4)	-0.4 (0.9)	-5.6 (1.1)	-11.1 (0.9)
Entropy	10.4 (1.7)	8.2 (1.3)	11.5 (1.6)	18.3 (3.3)	5.4 (3.1)
E/W	-5.2 (1.7)	-4.4 (1.2)	-4.1 (1.6)	7.7 (2.1)	36.5 (3.0)
NZ	-9.4 (4.1)	-7.8 (3.0)	-28.9 (3.8)	41.7 (7.9)	13.4 (7.4)
Australia	-6.4 (3.2)	-1.3 (2.4)	-18.4 (3.0)	20.1 (2.5)	29.0 (2.6)
Canada	-5.7 (2.2)	-3.2 (1.5)	-5.4 (2.0)	8.4 (3.2)	20.2 (3.9)
Eng*%G	(0.09)	(0.80)	(0.08)	(0.18)	(0.17)
NZ*%G	0.28 (0.16)	-2.59 (3.16)	2.32 (0.15)	-1.07 (0.32)	-0.59 (0.30)
Aust*%G	-0.01 (0.14)	-0.70 (2.96)	0.36 (0.13)	4.00 (0.27)	-4.04 (0.25)
Can*%G	0.22 (0.09)	0.65 (0.90)	0.12 (0.08)	0.05 (0.16)	0.46 (0.15)
R ²					
Stage 1	0.05	0.15	0.12	0.20	0.43
Stage 2	0.13	0.35	0.54	0.32	0.61
Stage 3	0.17	0.51	0.71	0.56	0.79

Significant regression coefficients at the 0.05 level or better are shown in bold

Table 10. Regressions for the distribution of the combined non-charter groups across certain segregation type combinations (standard errors in brackets)

Dependent	Model				
	A	B	C	D	E
a	55.0 (7.1)	33.6 (7.4)	35.5 (8.3)	40.2 (8.1)	48.2 (6.5)
logUP	4.6 (1.2)	8.3 (1.3)	8.0 (1.5)	-5.3 (1.4)	-5.9 (1.1)
logit%NCG	24.8 (1.0)	23.7 (1.0)	23.0 (1.2)	-6.0 (1.1)	-16.6 (0.9)
Entropy	-35.1 (3.3)	-26.9 (3.3)	-14.1 (3.8)	29.8 (3.8)	13.0 (3.0)
E/W	-11.5 (1.7)	-4.6 (1.7)	-11.3 (3.7)	12.2 (2.3)	-39.6 (2.9)
NZ	-14.7 (3.2)	-10.6 (3.3)	-41.1 (9.2)	41.9 (4.4)	55.2 (7.2)
Australia	-19.9 (2.1)	-22.2 (2.1)	-15.4 (4.9)	8.5 (2.9)	48.2 (5.6)
Canada	-16.3 (2.7)	-18.5 (2.8)	-5.0 (4.8)	5.9 (3.7)	27.5 (3.7)
Eng*%G	-0.31 (0.18)	0.43 (0.18)	0.84 (0.21)	0.71 (0.20)	-1.44 (0.16)
NZ*%G	-0.41 (0.31)	0.13 (0.31)	2.45 (0.36)	1.26 (0.36)	-1.66 (0.29)
Aust*%G	-0.68 (0.27)	-0.70 (0.27)	-0.77 (0.18)	4.36 (0.31)	-0.04 (0.24)
Can*%G	-1.03 (0.16)	-1.00 (0.16)	-0.87 (0.19)	0.18 (0.19)	0.51 (0.15)
R ²					
Stage 1	0.64	0.65	0.52	0.25	0.50
Stage 2	0.72	0.74	0.72	0.40	0.81
Stage 3	0.75	0.77	0.77	0.61	0.86

Key to models (combinations of types): A – V + VI; B – IV + V + VI; C – III + IV + V + VI; D – II + III; E – I + II.

Significant regression coefficients at the 0.05 level or better are shown in bold

Table 11. Summary statistics for the distribution of the Asian ethnic groups across the segregation types and type combinations

	N	Mean	SD	Mean	SD
V (F = 2.3)				V + VI (F = 2.4*)	
U.S.A.	15	13.5	8.6	21.2	18.2
England/Wales	35	9.4	9.6	17.7	17.9
NZ	4	1.0	0.7	1.0	0.7
Australia	6	2.8	3.6	2.8	3.6
Canada	12	8.4	12.1	11.8	15.1
IV (F = 5.0***)				IV + V + VI (F = 6.5***)	
U.S.A.	15	18.6	11.0	39.8	22.2
England/Wales	35	13.8	13.6	31.6	19.9
NZ	4	4.3	5.4	5.3	5.9
Australia	6	6.5	9.9	9.2	13.5
Canada	12	1.3	1.9	1.31	15.7
III (F = 2.8*)				III+IV+V+VI (F = 8.2***)	
U.S.A.	15	19.0	6.7	58.8	21.2
England/Wales	35	20.2	8.4	51.3	21.0
NZ	4	12.1	10.2	17.4	15.9
Australia	6	14.5	13.4	23.8	26.2
Canada	12	12.0	7.3	25.1	21.6
II (F = 13.5***)				II + III (F = 8.8***)	
U.S.A.	15	32.6	15.3	51.6	17.4
England/Wales	35	31.5	13.2	51.7	15.1
NZ	4	58.1	6.5	70.2	11.6
Australia	6	72.9	25.1	87.4	12.4
Canada	12	43.5	11.0	55.5	10.9
I (F = 8.5***)				I + II (F = 8.2***)	
U.S.A.	15	8.5	6.8	41.1	21.2
England/Wales	35	16.7	12.1	48.2	21.0
NZ	4	24.5	16.2	82.6	15.9
Australia	6	3.4	3.8	76.3	26.2
Canada	12	31.3	16.7	74.8	21.6

SD – standard deviation; N – number of cities

*** statistically significant at the 0.001 level or better; ** statistically significant at the 0.01-0.001 level; * statistically significant at the 0.05-0.01 level

Table 12. The residential distribution of ethnic minority groups in certain cities, compared with that of similar groups in selected US cities (shown in italics)

	Population	Group %	Group percentage living in type areas					
			VI	V	IV	III	II	I
England/Wales – Blacks: U.S.A. – Blacks								
London	8,278,251	8.8	0.0	0.7	42.2	17.2	35.1	4.8
<i>San Francisco</i>	<i>7,039,362</i>	<i>7.1</i>	<i>0.0</i>	<i>28.5</i>	<i>34.4</i>	<i>19.3</i>	<i>15.8</i>	<i>2.0</i>
<i>Washington</i>	<i>7,608,070</i>	<i>25.9</i>	<i>61.2</i>	<i>2.6</i>	<i>5.2</i>	<i>10.7</i>	<i>15.7</i>	<i>4.6</i>
Birmingham	970,892	5.6	0.0	4.1	35.6	15.0	24.9	20.4
<i>Albany</i>	<i>875,583</i>	<i>5.9</i>	<i>0.0</i>	<i>30.5</i>	<i>3.2</i>	<i>15.2</i>	<i>29.8</i>	<i>21.3</i>
Luton	185,543	5.9	0.0	1.5	14.8	9.4	63.3	11.0
<i>Elkhart</i>	<i>182,791</i>	<i>5.1</i>	<i>0.0</i>	<i>26.6</i>	<i>6.2</i>	<i>23.2</i>	<i>26.9</i>	<i>17.1</i>
Canada – Blacks: U.S.A. – Blacks								
Toronto	4,632,465	6.7	0.0	21.9	16.0	24.2	30.0	7.9
<i>Pittsburgh</i>	<i>2,358,695</i>	<i>8.0</i>	<i>51.9</i>	<i>09.4</i>	<i>0.1</i>	<i>8.5</i>	<i>21.2</i>	<i>18.0</i>
New Zealand – Maori: U.S.A. – Blacks								
Auckland	1,068,381	11.0	0.0	5.2	21.6	26.0	38.5	8.6
<i>Oklahoma</i>	<i>1,083,346</i>	<i>10.4</i>	<i>35.2</i>	<i>2.7</i>	<i>2.3</i>	<i>18.6</i>	<i>32.7</i>	<i>8.9</i>
<i>Louisville</i>	<i>1,025,598</i>	<i>13.8</i>	<i>56.2</i>	<i>0.2</i>	<i>0.7</i>	<i>8.0</i>	<i>20.8</i>	<i>14.1</i>
Christchurch	332,508	7.0	0.0	0.0	0.0	1.6	48.3	50.0
Wellington	337,524	12.0	0.0	1.6	9.9	18.9	52.7	16.9
<i>Peoria</i>	<i>347,387</i>	<i>8.8</i>	<i>36.7</i>	<i>1.6</i>	<i>0.2</i>	<i>21.7</i>	<i>28.1</i>	<i>11.7</i>
<i>Huntsville</i>	<i>342,376</i>	<i>20.8</i>	<i>53.3</i>	<i>1.5</i>	<i>0.2</i>	<i>12.6</i>	<i>23.4</i>	<i>8.9</i>
Hamilton	138,516	19.3	0.0	4.6	2.2	22.8	58.0	12.4
<i>Dothan</i>	<i>137,916</i>	<i>22.9</i>	<i>49.4</i>	<i>0.1</i>	<i>0.2</i>	<i>10.2</i>	<i>31.8</i>	<i>8.3</i>
Dunedin	108,168	5.6	0.0	0.0	0.0	0.4	33.6	66.1
Tauranga	94,806	15.6	0.0	7.6	0.7	9.1	54.1	28.6
<i>Elmira</i>	<i>91,070</i>	<i>5.7</i>	<i>0.0</i>	<i>32.5</i>	<i>0.0</i>	<i>6.5</i>	<i>31.5</i>	<i>29.5</i>
<i>Gadsden</i>	<i>103,459</i>	<i>14.6</i>	<i>62.2</i>	<i>2.3</i>	<i>1.4</i>	<i>12.9</i>	<i>13.6</i>	<i>7.7</i>
New Zealand – Pacific Islanders: U.S.A. – Hispanics								
Auckland	1,068,381	14.3	0.0	18.6	33.2	23.6	22.4	2.2
<i>W Palm Beach</i>	<i>1,113,184</i>	<i>12.4</i>	<i>3.7</i>	<i>16.8</i>	<i>6.6</i>	<i>17.6</i>	<i>35.6</i>	<i>19.7</i>
<i>Hartford</i>	<i>1,183,110</i>	<i>9.6</i>	<i>3.3</i>	<i>33.6</i>	<i>14.2</i>	<i>14.4</i>	<i>19.3</i>	<i>15.2</i>
Wellington	337,524	9.1	0.0	8.6	24.1	21.6	38.2	7.5
<i>Reading</i>	<i>373,638</i>	<i>9.7</i>	<i>31.8</i>	<i>8.1</i>	<i>5.8</i>	<i>21.3</i>	<i>20.1</i>	<i>13.0</i>
<i>Beaumont</i>	<i>385,090</i>	<i>8.0</i>	<i>9.3</i>	<i>12.6</i>	<i>25.7</i>	<i>13.5</i>	<i>15.9</i>	<i>23.1</i>
Australia – Pacific Islanders: U.S.A. – Hispanics								
Sydney	3,847,287	5.1	0.0	1.9	34.6	32.7	30.1	0.7
<i>Seattle</i>	<i>3,554,760</i>	<i>5.2</i>	<i>0.0</i>	<i>2.8</i>	<i>7.1</i>	<i>13.7</i>	<i>48.0</i>	<i>28.4</i>

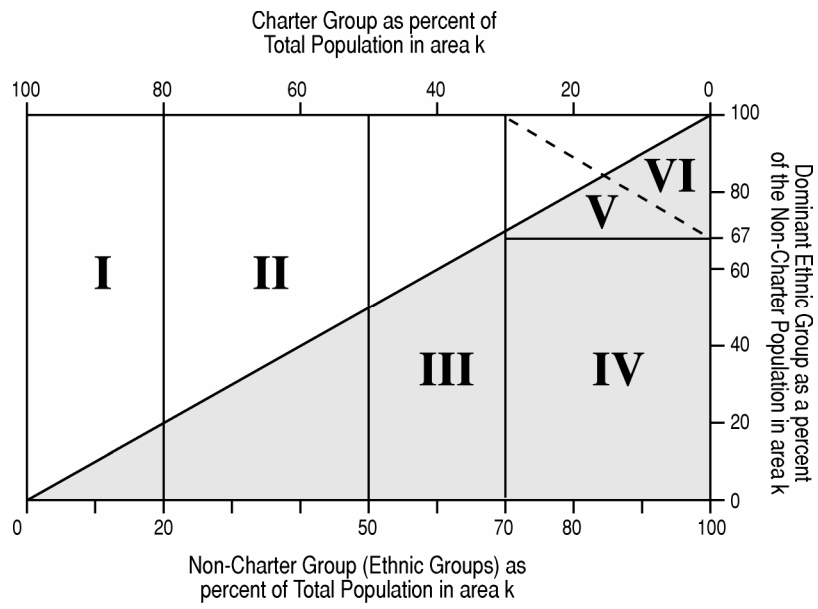


Figure 1. The typology.

Correspondence: School of Geographical Sciences, University of Bristol, Bristol, BS8 1SS, U.K., e-mail: R.Johnston@bristol.ac.uk (Johnston); Department of Human Geography, Macquarie University, Sydney, NSW 4109, Australia, e-mail: mike.poulsen@mq.edu.au (Poulsen); Department of Human Geography, Macquarie University, Sydney, NSW 4109, Australia, e-mail: jforrest@els.mq.au.edu (Forrest).